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MEMORANDUM

To: Paul Apple, Town Manager, Town of North Hampton

From: Tanya Justham, Ronald Breton, P.E., and Muriel Robinette, P.G.,
GZA GeoEnvironmental, Inc.

Date: June 26, 2017

File No: 04.0190538.01

Re: Review of Site Investigation Report dated April 4, 2017, prepared by Exeter
Environmental Associates, Inc. (Exeter)

As requested by the Town of North Hampton (Town) in an email dated May 4, 2017, GZA GeoEnvironmental, Inc., (GZA) has reviewed a Site Investigation (SI) Report¹ for the Hampton Rod and Gun Club Property prepared by Exeter.

The SI was required by the New Hampshire Department of Environmental Services (NHDES) in a letter² dated December 3, 2013 following observations of impacts to on-site wetlands and surface water from firearms shooting activities made during a NHDES inspection of the facility. The SI report summarized site activities and investigations that have occurred since 2013, including groundwater monitoring well installations and multimedia sampling described in previous submittals, and the surface water and sediment sampling and analysis that occurred during 2016. The delineation of soil impacts on the Hampton Rod and Gun Club property and adjoining properties appears to be relatively complete; therefore, additional soil sampling was not included in the 2016 sampling activities.

The 2016 surface water and sediment sampling was performed under the Sampling and Analysis Plan for the site dated August 2, 2016. Surface water samples were collected both during a rain event and after a dry period to evaluate the mobilization of lead to the Little River by overland stormwater flow. The results of this comparison were inconclusive due to variations in the detected surface water lead concentrations that preclude concluding that the lead is primarily mobilized during precipitation events.

Although GZA did not perform a comprehensive comparison of the SI report to NHDES regulations for preparing a SI, the report appears to generally conform with the requirements of the New Hampshire Code of Administrative Rules Env-Or 600 Contaminated Site Management, with the exception of the Site Plan detail regarding site surface topography (Env-Or 606.04(m)(5)). Since surficial transport of lead-contaminated soil is interpreted by Exeter on page 10 to be the primary mechanism of surface water contamination, understanding overland flow (e.g. channelization versus

¹ Report titled "Site Investigation, Hampton Rod & Gun Club Property (DES # 201310001), 189 Atlantic Avenue, North Hampton, New Hampshire," and dated April 4, 2017.

² Letter from NHDES titled "DES Site #201310001 and Land Resources Management File No. 2013-01355, Atlantic Ave, North Hampton," dated December 3, 2013.



sheet flow) is an important fate and transport mechanism needed to accurately understand the site. GZA notes that Exeter has attempted to develop an understanding of channelized flow with Figure 6a and Figure 6b; however, a topographical survey would advance understanding of overland flow.

GZA notes the following concerns identified during the review of the SI report:

- Inconsistent dates for the development of the current configuration of the trap range and pistol/rifle range;
- Exeter states on page 10 and reiterates in the conclusions that the *“shallow groundwater at the pistol/rifle range is a possible, but not likely significant, contributing source of dissolved lead to surface water;”* however, groundwater is near to or at ground surface for much of the year and the top of each monitoring well screen is located no less than 3 feet below ground surface. Groundwater would be expected to encounter, and potentially mobilize lead, within the 2 feet below the ground surface where lead impacts were identified by Exeter. In addition, a downward groundwater flow is not anticipated within the recharge zone of the wetlands; therefore, the screens of the monitoring wells are placed too deep to effectively gauge the transport of lead to surface water by shallow groundwater flow. Transport by near-surface groundwater and wetland sediment porewater should not be dismissed as a mechanism for surface water impacts. Potential investigative methods to close this data gap could include shallow piezometers within the wetland areas or sediment pore water sampling beneath the Little River to evaluate the contribution of dissolved lead from groundwater to surface water;
- The volume of soil exceeding NHDES Soil Remediation Standards (SRS)³ is based on a depth of 0.5 feet, while the volume of soil exceeding the upper contamination limit is based on a depth of 2 feet. Since the SRS is the more stringent regulatory standard, the shallower depth measurement for SRS exceedances should be reevaluated;
- Wetland sediments were not compared to sediment screening criteria as requested by NHDES;
- The second paragraph on page 5 of the SI report describes a maintenance activity of *“...liming the trap fields each spring to increase soil pH.”* The spreading of lime is consistent with the Best Management Practices (BMPs) for Lead at Outdoor Shooting Ranges manual⁴ developed by the U.S. Environmental Protection Agency (EPA); however, spread lime generally raises the pH of the very top soil layer, and may not impact lead contamination already at depth. In addition to spreading lime, EPA recommends that the soil pH be checked at least annually to verify that the lime is effectively raising the pH to within the recommended range of 6.5 standard units (SU) to 8.5 SU. Current information provided by Exeter does not indicate that soil pH measurements have been collected since soil sampling occurred.
- The water quality sample collected from the downgradient surface water sampling location on the Little River (SW-7) contained concentrations of lead that exceeded the NHDES Water Quality Criteria for Toxic Substances (WQCTS), Protection of Aquatic Life, Fresh Chronic Criteria,⁵ and the associated sediment sample exceeded sediment screening criteria. The extent of downgradient impacts within the Little River have not yet been fully delineated; and

³ SRS are included in Table 600-2 of Env-Or 600 Contaminated Sites Management (Env-Or 606.19 Soil Remediation Criteria).

⁴ EPA Region 2, 2005, Best Management Practices for Lead at Outdoor Shooting Ranges, EPA-902-B-01-001, Revised June 2005.

⁵ WQCTS are included in Table 1703-1 of Env-Wq 1700 Surface Water Quality Standards (1703.21 Water Quality Criteria for Toxic Substances).




- The conclusions inaccurately state that concentrations of lead *"in the Little River are generally low, although levels at two stations exceed conservative Chronic Water Quality Criteria."* Based on the analytical data summarized earlier in the same paragraph and included in Table 6a, the results of only two of the surface water sampling locations did not exceed the WQCTS Protection of Aquatic Life, Fresh Chronic Criteria.

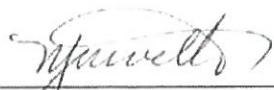
In GZA's opinion, the submittal of this SI report, in accordance with the 2013 request from NHDES and summarizing the fragmented investigations that have occurred at the site, is an appropriate step for this site prior to considering remedial efforts.

Based on GZA's experience with similar sites, we anticipate that NHDES will review the report and prepare a response letter potentially requesting clarification and/or corrections on specific topics or data sets within the report or additional investigations to fill any data gaps. If no additional investigations are required, GZA anticipates NHDES will request the preparation and submission of a Remedial Action Plan addressing impacted media and localities. In addition, NHDES will likely request additional long-term monitoring of surface water and sediment.

GZA recommends the following potential communications with NHDES for the Town's consideration:

- In consideration of the long period of time between the initial request by NHDES for the SI and the submittal of this SI report, request that NHDES expedite the review of the SI report in order to maintain momentum on the project;
- Request that a regular sampling schedule be implemented for surface water to monitor long term trends;
- Request additional downgradient surface water/sediment sampling along the Little River to identify the full downgradient extent of lead impacts; and
- Consider sharing GZA's general comments related to the SI report with NHDES.


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